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# 22ème Réunion et Conférence de l'Association Africaine des Entomologistes
# 22nd Meeting and Conference of the African Association of Insect Scientists
# الإجتماع والمؤتمر العلمي الثاني والعشرون للجمعية الأفريقية لعلماء الحشرات

Date: 23 – 26 October 2017
Venue: ARC, Wad Medani, Sudan

التاريخ: 23 - 26 أكتوبر 2017
المكان: هيئة البحوث الزراعية، ود مدني، السودان

*"Towards securing human welfare through management of insect diversity in a changing world"*
*"Vers une amélioration du bien-être humain grâce à la gestion de la diversité des insectes dans un monde en mutation"*
"نحو تأمين الرفاهية البشرية من خلال إدارة تنوع الحشرات في عالم متغير"

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# "TOWARDS SECURING HUMAN WELFARE THROUGH MANAGEMENT OF INSECT DIVERSITY IN A CHANGING WORLD"

# "VERS UNE AMÉLIORATION DU BIEN-ÊTRE HUMAIN GRÂCE À LA GESTION DE LA DIVERSITÉ DES INSECTES DANS UN MONDE EN MUTATION"

"نحو تأمين الرفاهية البشرية من خلال إدارة تنوع الحشرات في عالم متغير"

**Edited by / Edité par :**
Bonaventure OMONDI AMAN, Sévilor KEKEUNOU, Mauricette OUALI-N'GORAN, Faiza Elgaili Elhassan SALAH, Chrysantus TANGA MBI, Emana GETU, Elisabeth ZANOU and Pascal AYELO.
Design and layout by / Conception et mise en page par: Saliou Niassy

impact on longest petiole, the length of second leaf, while the surface area of the second leaf was not significantly affected by the treatment. Time, treatment, and combined effect of system * time had a significant impact on the number of ramets ($p<0.05$), with no significant difference in the number of leaves for any of the treatment. The river treatment had a higher number of: petioles mined (3.5±0.23), nymphs (108±6.94) and adults (34.5±4.48) of *M. scutellaris* than the tidal treatment; with no significant difference in the number of adults ($t [6] = 1.93$, $p-< 0.10$). The number of nymphs was however significantly different ($t [6] =3.98$, $p< 0.007$). Moreover, the weevil *N. eichhorniae* oviposited only in the river system,, but not the tidal system. The plant hopper *M. scutellaris* was capable of survival in different treatments compared to *N. eichhorniae*, but population build up was slow. These results showed that in areas experiencing tidal fluctuation, biological control using *N. eichhorniae* may be very low, but could be sped up by the introduction of other species whose life cycle occurs on top on water hyacinth mat.

**Key words:** *Eichhornia crassipes*, *N. eichhorniae*, *M. scutellaris,* plant parameters, tidal and river system.

## ST-7.22. Establishment of the Fungal Entomopathogen *Beauveria bassiana* as Endophyte in Cabbage Plant (*Brassica oleracea*) for Disease and Lepidopteran Larvae Pest Control.

Heviefo G A[1, 2], Nyamador S W[2], Glitho I A[2], Tamo M[1]

[1] International Institute of Tropical Agriculture, 08 BP 932 Tripostal, Cotonou, Benin

[2] Applied Entomology Laboratory, Faculty of Sciences, University of Lomé, 01 BP 1515 Lomé 1, Togo

**Abstract**

Preliminary studies showed that *Beauveria bassiana* strains were potentially pathogenic to lepidopteran species. In recent studies, a virulence of *B. bassiana* Bb11 on *Plutella xylostella* L. (Lepidoptera: Plutellidae) was determined in spraying application. Likewise, several studies reported strong evidence on the endophytic characteristics of *B. bassiana* for systemic resistance and biological control. The present study assessed the endophytic colonisation of cabbage (*Brassica oleracea*) plant by *B. bassiana* Bb11. Then, research focused on *B. bassiana* greatest colonization and its persistence in cabbage plant. The fungus was applied by seed coating and root soaking methods using conidia powder. The effects of *B. bassiana* on cabbage seed germination and plant growth were examined. Leaf, stem and root colonization was assessed after fungus application. Germination of seed coated with *B. bassiana* powder was not significantly affected ($P > 0.36$). Although seed or root treatments have facilitated rapid colonization of the cabbage plant, endophytic colonization has varied in both plant parts and sampling period. Colonization was higher in leaves and stems than in roots ($P < 0.0001$) and had no effect on cabbage plant growth ($P > 0.77$). *B*. *bassiana* had persisted in leaves and stems and was detectable for at least two months. The persistence was best in plants of which the seeds were coated and roots soaked during replantation. The greatest colonization of plant by *B. bassiana* suggests a novel approach of biological control and further investigations of endophytic fungal virulence on larvae could be made using fungal conidia powder.

**Keywords**: *Beauveria bassiana, Plutella xylostella,* Conidia powder, endophyte, plant colonization.

## ST-7.23. Pathogenicity and Horizontal Transmission of *Beauveria bassiana* and *Metarhizium anisopliae* Isolates Used Against *Sahlbergella singularis*, Cocoa Pest in Cameroon

Mahot H C[1,3], Hanna R[1], Bagny Beilhe L[2] and Bilong Bilong C F[3]

[1]Laboratory of Pathology, International Institute of Tropical Agriculture (IITA), BP 2008, Yaoundé-Messa, Cameroon

[2]CIRAD, UPR Bioagresseurs, Montpellier, France

[3]Department of Animal Biology, Faculty of Science, University of Yaoundé I, P.O. 812, Yaoundé Cameroon

**Corresponding author email**: mahotclaudine@yahoo.fr

**Abstract**

The brown cocoa mirid, *Sahlbergella singularis* (Heteroptera: Miridae) has been named the most economically important insect pest of cocoa across West African and it is capable to cause yield loss of about 30 to 70%. The pathogenicity of six indigenous isolates of *Beauveria bassiana* and *Metarhizium anisopliae* to fourth and fifth nymphal stage of mirid was evaluated. The mirid-

to-mirid transmission of conidia of those fungal isolates was the investigated under laboratory conditions. Pathogenecity was tested using two assays: contact and by ingestion at various conidial concentrations. Tween 80 (v/v) of 0.1 % was used as a control. For contact application method, the six isolates showed mortalities significantly higher than the control. In ingestion method some isolates (BIITAC6.2.2, BIITAC8.1.5, MIITAC11.3.4 and MIITAC6.2.2) were not significantly different from their control (pβ0.05). Corrected mortality ranged from 35 to 100% in contact application and from 16 to 94.28% in ingestion method. Mycelial out growth and sporulation on some dead insects after seven days in dark conditions demonstrated that much of the death was due to the fungal infection (mycosis).We observed a mycosis ranged from 19.73 to 91.66%. On Mirid to Mirid transmission, 20, 50 and 80% of mirid population were infected by fungi. At the end of experiment, mortality obtained in treated batch and untreated one could reach 100%. Mortalities of untreated mirids started before the death of all treated-fungus insect. No difference has been found between the mortalities of treated-fungus mirids and untreated ones. These results showed that, Cameroonian entomopathogenic fungi strains of *B. Bassiana* and *M. anisopliae* can be used as biocontrol agent disseminated by insect and they appear to be excellent candidates for further development of biopesticide targeting cocoa mirids.

***Key words:*** *entomopathogenic fungus, pathogenicity, biocontrol, mirids.*

## ST-7.24. Efficacy of Cameroonian Entomopathogenic Fungal Isolates and Their Epizootical Ability for the Control of Banana Weevil *Cosmopolites sordidus* Germar, 1989 (Coleoptera: Curculionidae)

Membang G [1,2], Hanna R[1] and Ambang Z[2]

[1]International Institute of Tropical Agriculture, IITA-Nkolbisson, Box. 2008 Messa (Yaounde) Cameroon.

[2] Departement of Plant Biology, University of Yaoundé I, Faculty of Sciences.Box. 812 Yaounde- Cameroon

**Corresponding author email:** G.Membang@cgiar.org

**Abstract**

In sub-Saharan Africa where banana and plantain play a vital role in food safety of the populations. The challenge is to increase production using preferably strategies not harmful to humans and the environment. Thus effective management of important insect's banana/plantain pests such as banana weevil is necessary. Cameroonian isolates of *Beauveria* and *Metarhizium* have proven their virulence against banana weevil *C. sordidus* but no information exists on their epizootic ability. Our study therefore presents infective potentials of four Cameroonian isolates in epizootical perspectives. Laboratory bioassays were carried out by immersion of adult weevils in conidial suspension 3.2 x$10^8$ conidia $mL^{-1}$ in other to evaluate the efficacy of Cameroonian isolates of *B. bassiana (*BIITAC6.2.2, BIITAC10.3.3*)* and *M. anisopliae* (MIITAC11.3.4 and MIITAC6.2.2). The results obtained showed that all tested isolates were pathogenic to weevils, causing mortality rate up to 96%. The lowest value of $LT_{50}$ and $LT_{90}$ were respectively 3.49 and 16.67 days for *B. bassiana* BIITAC6.2.2 and 6.46 and 31.78 days for *M. anisopliae* MIITAC11.3.4. The inoculum of the tested isolates was transmitted in the host population from treated insect to healthy ones. In this study, conidia production per cadaver was similar among isolates except BIITAC6.2.2 which showed in parallel high conidia yield (5.4x$10^{10}$ conidia/ml) on insect and the best performance (mortality of untreated > 52% at vector ratio 50%) in the transmitting disease probably due to its higher virulence, as confirmed in mortalities and infection rates. This means that greater number of *B. bassiana* conidia produced may influence transmission rate. These results show that indigenous strains of *M. anisopliae* and *B. bassiana* are potential bio-controls agents that may help to improve the use of a biological control approach based in attraction–infection traps to control banana weevil, *C. sordidus* in banana plantations.

**Key words:** Cameroon, entomopathogen, banana weevil

## ST-7.25. Screening Strains of *Beauveria bassiana* for Endophytic Behaviour in Sorghum, and Biocontrol Activity against *Chilo partellus* and *Sesamia calamistis*.

Bancole W B A[1], Laing M D[1], Yobo K S[1], Togola A[2]

[1]University of KwaZulu-Natal, SAEES, Discipline of Plant Pathology, Pietermaritzburg, South Africa.

[2]IPM Program, International institute of Tropical Agriculture, Ibadan, Nigeria.

**Abstract**

Sorghum is an important cereal crop grown globally, for animal feed and human consumption. Lepidopteran stem borers are